Community Assistantship Program

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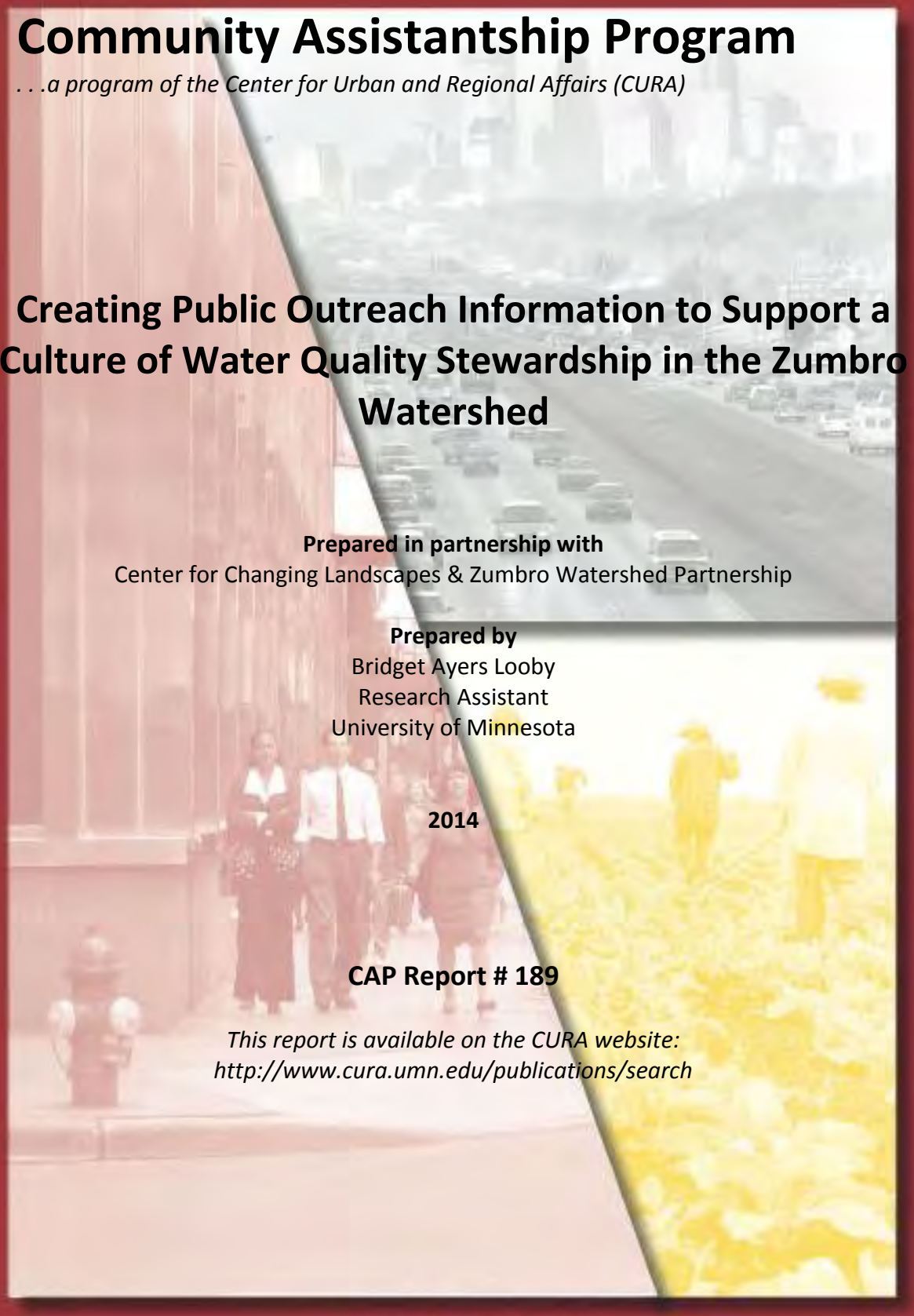

Creating Public Outreach Information to Support a Culture of Water Quality Stewardship in the Zumbro Watershed

Prepared in partnership with
Center for Changing Landscapes & Zumbro Watershed Partnership

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CREATING PUBLIC OUTREACH INFORMATION TO SUPPORT A CULTURE OF WATER QUALITY STEWARDSHIP IN THE ZUMBRO WATERSHED

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PROJECT PARTNERS:

Zumbro Watershed Partnership, Inc.
University of Minnesota Southeast Regional Sustainable Development Partnership
University of Minnesota Extension
Department of Natural Resources
Soil and Water Conservation District Staff
Goodhue, Dodge, and Olmsted Counties

FUNDING PROVIDED BY:

University of Minnesota Southeast Regional Sustainable Development Partnership

CENTER FOR CHANGING LANDSCAPES
COLLEGE OF DESIGN
Department of Forest Resources
College of Food, Agricultural and Natural Resource Sciences
UNIVERSITY OF MINNESOTA

Center for Changing Landscapes
College of Design
College of Food, Agriculture & Natural Sciences
University of Minnesota

EXECUTIVE SUMMARY

This project was a combined effort between the University of Minnesota Center for Urban and Regional Affairs, The Center for Changing Landscapes, and The Zumbro Watershed Partnership. The focus of the position was to assist in gathering historic, water quality impairment, and ecological data about the Zumbro River watershed in southern Minnesota. These findings were added to a previous body of information on the Zumbro River watershed compiled by the Center for Changing Landscapes. Eventually, this assembly of research will assist in the creation of informational kiosks, or "education stations" in public spaces within the watershed, and be used to apply for further grant funding on behalf of the Zumbro Watershed Partnership.

The research was focused on gathering information on three specific sites in the watershed: Mantorville, Wanamingo, and Greenbridge. Although Mantorville, Wanamingo, and Greenbridge are geographically similar, their background and present use is quite different. It was discussed during initial meetings with the Center for Changing Landscapes that the historic and cultural context of each of the sites should be addressed. These nuances were explored in order to best cater the education stations to each site.

"The Zumbro Watershed has many water quality challenges. Because 98% of the watershed is in private ownership, public education and engagement are necessary for private action to improve the health of the river."

-Zumbro Watershed Partnership

GOALS OF THE POSITION

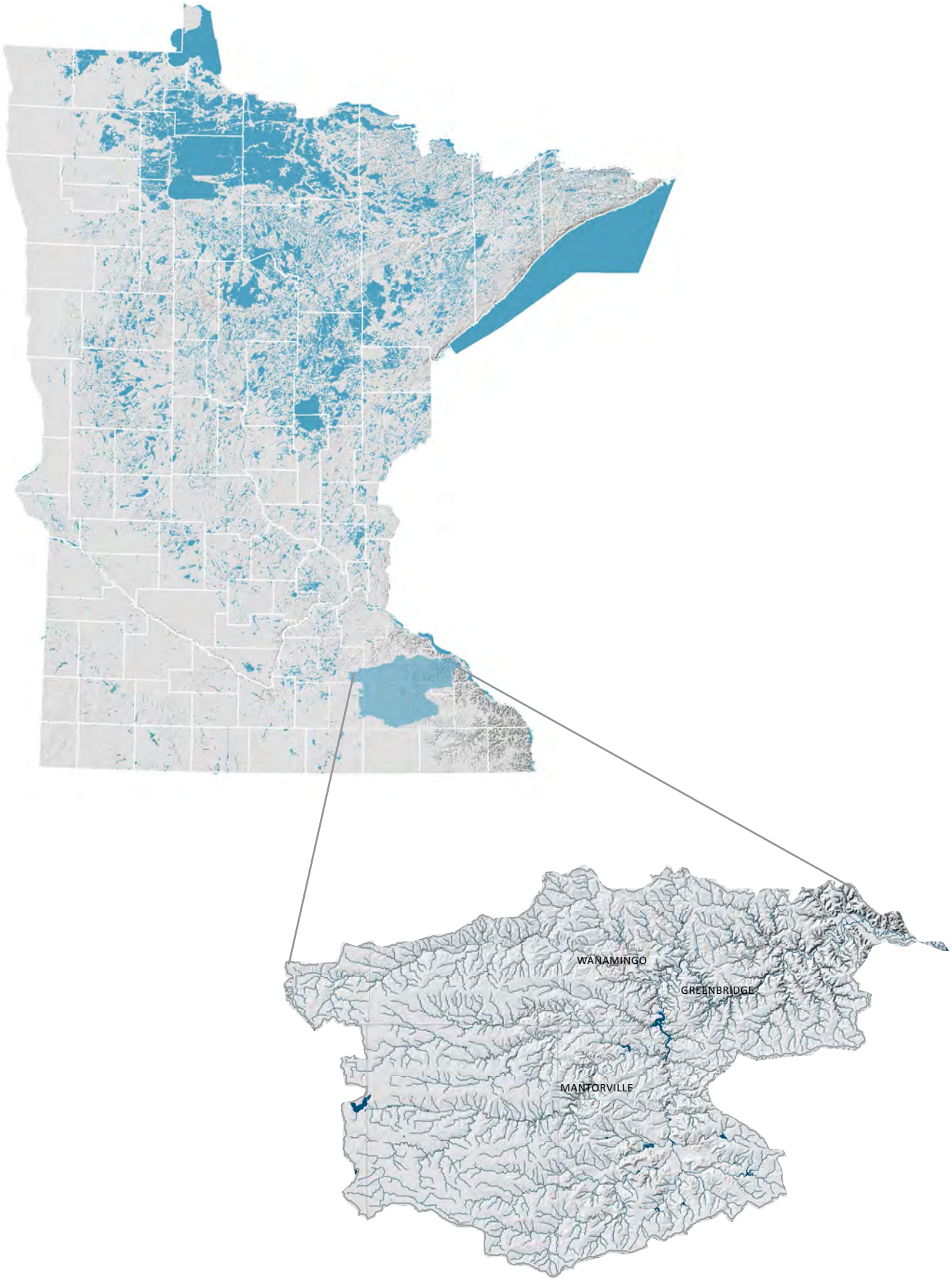
The goal of this position, as identified by the Zumbro Watershed Partnership, is to "create some of the content for the education stations." These education stations/informational kiosks, as mentioned, will provide outreach and educational information that depict how land practices in the watershed impact water quality and quantity.

Why education stations? According to Kevin Strauss, Education Coordinator at the Zumbro Watershed Partnership, "No one can name the river [because there are] no signs!" By focusing on building awareness of the river and its benefits and threats, the Zumbro Watershed Partnership can better execute their outreach goals.

In order to gain an understanding of the future implications of current land use, it is helpful to take a look at past land use practices in light of current challenges. Also, when considering outreach to the public, a sociocultural lens is helpful to root people to the place and allow them to identify with their ancestors; a stronger connection to the land and water can be made. Further, an overview of the history of each location is important to the specific character of each site, whether it be agricultural, industrial, or ecological. Another aspect of the research was the development of GIS materials depicting specific impairments within the focus area. These will be paired with the existing research about water quality concerns in the Zumbro River watershed to create a holistic overview of the watershed's health and history.

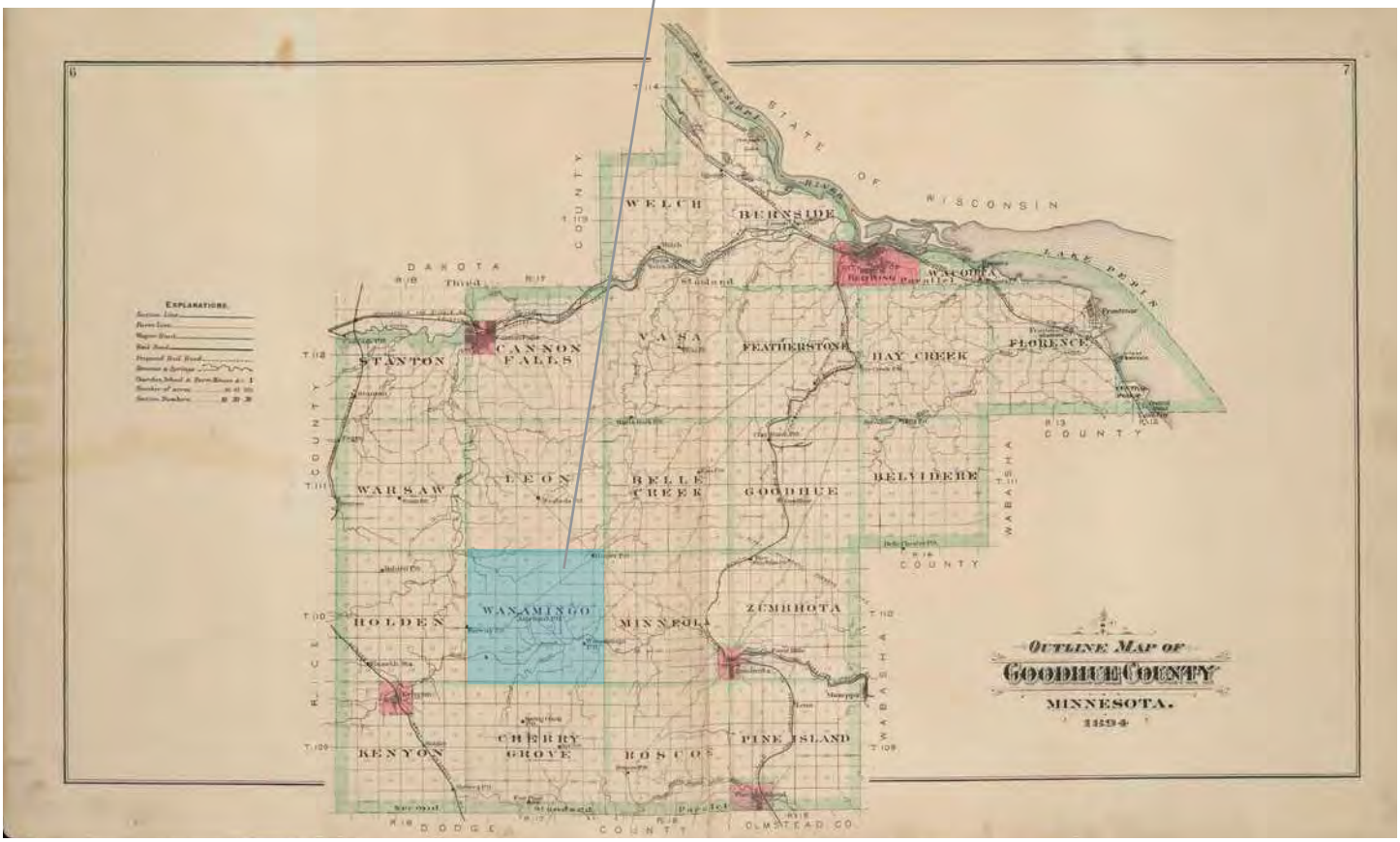
In this way, the research collected here can help answer the question posed by the Zumbro Watershed partnership, "[how can we] promote a culture of water quality stewardship?"

WATERSHED CONTEXT



Wanamingo's Agricultural Legacy

When referring to Wanamingo and its context, farming immediately comes to mind; the town is an icon of rural Minnesota agriculture. Much of this can be traced back to the area's hearty Scandinavian settlers and their agrarian lifestyles. However, the town's agricultural legacy goes back much further, to the area's original inhabitants: the Dakota people.



Goodhue County (1894) | Borchert Map Library

Subsistence for the Dakota consisted of a combination of cultivating crops, gathering food, and hunting. During the fertile months, women and children raised corn, beans, and squash. These crops were known together as the three sisters, because of their mutually beneficial relationship, and are well known for their connection with Native American lifestyles. After harvest, the Dakota turned to gathering wild rice in the rivers. The combination of these cultivation and gathering methods, as well as hunting, allowed communities to survive through the winter. (Historic Fort Snelling.org)

Little Crow's village on the Mississippi | MNHS

Buffalo hunt near St. Peter | MNHS

There was one tribe specific to Goodhue county that is consistently mentioned in historical records: The Mdewakanton Sioux. During parts of the year, this tribe apparently inhabited the area where modern day Wanamingo lies, as well as surrounding areas. During the construction of Red Wing, Minnesota's main street, a Native American burial site was unearthed, revealing a Thomas Jefferson peace medal inscribed in 1801. These were given to chiefs to honor them in peaceful negotiations. The medal found was likely given by Zebulon Pike during his initial exploration of the area, given to and buried with the chief of the area, after which the town was named. (MNHS) Pieces of evidence such as these point to a long and steady inhabitation of the Wanamingo area by this agriculturally savvy culture.

Ka-ka-kel Little Crow, Chief of Mdewakanton Sioux (1858) | MNHS

BY LAWRENCE TALIAFERRO,

Agent of Indian Affairs at St. Peters....to all whom it may concern.

Trading certificate between Henry Sibley and Mdewakanton (1838) | MNHS

During the mid to late 1800's, Minnesota's population grew rapidly due to an influx of Scandinavian homesteaders. Homesteading life was not always easy, and families worked together on their farms, collaborating with neighbors to create strong ties and prosperity throughout the community. One key to progress for these farms was the Zumbro river, providing irrigation and cultivating lush fields for all. These hardworking farmers helped establish the legacy Wanamingo enjoys today as a successful agricultural community.

Downtown Wanamingo (1900) | MNHS


Early Norwegian Farm in Southern Minnesota (circa 1890) | MNHS

Norwegian farmers in Minnesota (1910) | MNHS

Wanamingo Norwegian Lutheran Church (1934) | MNHS

Wanamingo Farmers Elevator (1910) | MNHS

Wanamingo Farmers Elevator (1950) | MNHS

Wanamingo Aerial Photograph (1970) | Borchert Map Library

Wanamingo Aerial Photograph (1976) | Borchert Map Library

The first hand account below provides a very real sense of what the area was like for the early settlers of Wanamingo during this period of developement. The following excerpts were taken from a book written by an early settler of Goodhue County, who was charged with documenting the initial developments of the young town of Wanamingo (among others).

A Geographical & Statistical Sketch of the Past & Present of Goodhue County
W.H. Mitchell, 1869

Selected excerpts, pages 135-138

"The residents of Wanamingo are nearly all of the Lutheran persuasion… There are three churches, all built by the Lutherans; and seven school houses, in the latter of which schools are taught for some nine months in the year."

"The first store was built in the little village of Wanamingo in 1857, by J.F. Wright. The same year a hotel was built at Hader, in the northeast part of the town by Messrs. Swift & Wales. There are at present four stores of general merchandise in town…"

"Though the various trades of mechanics are well represented, the principal business of the settlers is farming, and most of the farms are improved with good dwellings and large barns, the size of the latter being, as a general thing about 36x60 feet, with stone basements for stables."

"The organization of Wanamingo took place at the time of the first organization of towns after Minnesota became a state, in the 11th of May, 1858…"

"The average yield of wheat is from eighteen to twenty bushels per acre, with corn, oats, and other grains in proportion. There is a good grist mill in the south east part of the town, on the Zumbro, which affords facilities to the farmers for getting all their grain converted into flour and feed that they need for home consumption."

"There is but little timber, perhaps not to exceed three sections in all. What there is is of a fine quality, however, being composed of all the varieties found in southern Minnesota."

"The north branch of the Zumbro, which runs through the southern portion of the town, affords several excellent water-powers, only one of which is improved. The soil is a black loam resting on a clay subsoil, making it of more permanent vitality than where the subsoil is sand and gravel."

1853, a town site was laid out, and active preparations began for having a village at once, and strong hopes were entertained of rivalling Red Wing. Bullard and Post built a steam saw mill, which was the first west of the Mississippi river.

J. B. Smith built a hotel in 1854, Bullard's house being the only home for travelers up to that time. This hotel was subsequently removed to Mt. Pleasant, in Wabasha county, and now does service as the residence of Rev. Mr. Williams. In 1855 Daniel Saunders built another hotel, which in 1864 was removed to the town of Featherstone, and was converted into a dwelling house, the residence of Rev. Ezra Tucker.

In 1857 the population was increasing so rapidly that the two hotels already built could not accommodate the demands of the travel and immigration, and George W. Bullard built a large hotel, 40x60 feet, and finished it in the best manner. This did excellent service for a time, but business, travel and population began to decrease about as rapidly as they had augmented, and in 1864 there being no use for it at Waucouta, it was sold to Messrs. Tibbetts & Hackett of Lake City, who removed it thither on the ice during the winter. In 1857 the commissions of the postmaster at Waucouta amounted to $75 per quarter; at the present time it is about $5 per annum.

The first birth was in the family of G. W. Bullard in 1852. The same child died in 1854, which was the first death in the town.

The first marriage was that of Joseph F. Thompson and Miss Melissa Pingrey, in 1855, James B. Smith, Esq., performing the ceremony.

In the fall and winter of 1854 J. F. Pingrey taught a school in a hall over a store. Rev. J. W. Hancock and Rev. Mathew Sorin held meetings as early as 1853.

There is now one school house and only one school district. There are no stores, hotels, churches, or any business carried on except farming. In 1862 there were 32 registered voters; seventeen of these entered the army, which kept the town always ahead of its quota.

The history of Waucouta was brilliant but brief, and so far as the village is concerned might be written, "It was and is not."

WANAMINGO

WANAMINGO is bounded on the north by Leon, east by Minneola, south by Cherry Grove, and west by Holden. It is settled mostly by Scandinavians. The first settlement was made in June, 1854, by Henry Nelson, Toege Nelson, Jens N. Ottun, N. K. Fenne, Thosten Anderson, Andrew Barnhus, John Strome, Andrew Hesedal, Colburn Ecktveit, Gilbert Nelson, and N. J. Ottun. In September following Knut N. Fenne was born, which was the first birth of a white child. The first death was Miss Bereth Anderson, in July, 1854.

A Geographical & Statistical Sketch of the Past & Present of Goodhue County (1869) | MNHS

Wanamingo Township Plat (1884) | Borchert Map Library

Wanamingo Township Plat (1914) | Borchert Map Library

The education station to be placed in Wanamingo will be put in Riverside Park, which is located on the North end of the downtown area. The park itself has a historic background and connection to the river, which was explored in order to provide a deeper connection between the public and the land and water they live with.

The aerial photographs on the left depict the park in 1938, at which point it was a reservoir resulting from a dam in the Zumbro River (Borchert Map Library). The right hand photograph is a current Google image of the site.

Riverside Park is an excellent example of Wanamingo's agricultural legacy; the park was initially employed as the site of Wanamingo's first mill. Below is a brief timeline of this milling industry and its relation to Riverside Park and the Zumbro River.

1857: Mill was built on present day Riverside Park location
The steep slope of the river immediately beside the mill was a primary factor in its placement.

1858: Minnesota became a state

1868: Mill was moved
The relocation placed the mill near the ending of present day County Rd. 30. The mill dam was located at the confluence of Shingle Creek and the Zumbro River.

1891: Mill building was destroyed in a fire

1893: Mill was rebuilt with stone

1900s: Steam engine was added to mill
With this new technology and less reliance on natural systems, the mill can now run 6 days a week.

1917: End of flour milling in Wanamingo
Due to the beginning of the Depression, the war, and the advent of new technologies, the mill is no longer economically viable.

1920s: Mill was taken down

Wanamingo Mill (1893) | Gary Bakko

After its milling days, the use of Riverside Park changed once again. The site was flooded and turned into a much-loved community reservoir, thanks to the Wanamingo dam in the Zumbro River. The dam was a result of the Federal Dam Project, which was initiated by the Works Progress Administration (WPA) during the Great Depression. It was completed in December of 1937, and thereafter provided opportunities for both fishermen and citizens. Residents remember "Lake Wanamingo" as a popular spot in the summertime to relax and enjoy the cool water.

The connection of the citizens to the river at this point in history transitioned from industrial to recreational, and the WPA project installed infrastructure to encourage this type of use. The photo below depicts the dam in 1938, and a small raft can be seen floating in the reservoir, intended for swimmers. Just out of the frame were other elements of the project: a large limestone fireplace, swing set, and playground for citizens of Wanamingo.

Wanamingo Dam (1938) | Gary Bakko

Wanamingo was a town of agriculture, but it also has roots in dairy. These roots are strong even today, and can be seen in the existence of multiple dairy farms surrounding the area. The photograph below depicts the town's creamery, adjacent to the original steel trestle bridge spanning the Zumbro River. This bridge was replaced in 1937 as part of a larger road improvement project. As Gary Bakko, Wanamingo resident and writer states:

"Wanamingo may have had good rail service since its beginning in 1903, but good roads came at a slower pace. In the early '20s a road building crew completed a stretch of road from Wanamingo to Hader, and for a while camped a few hundred yards south of the farm Thora Thoreson Ring grew up on."

Wanamingo Creamery (circa 1930) | Gary Bakko

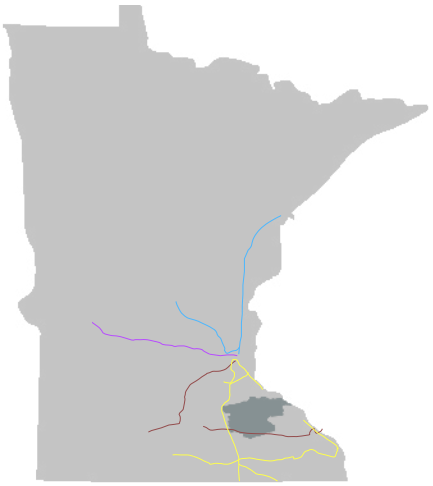

Young Thora Thoreson on Cart (circa 1925) | Gary Bakko


Road to Hader (circa 1925) | Gary Bakko

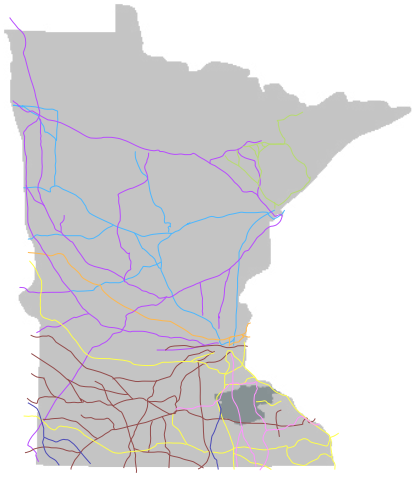
Camp for Road Builders (circa 1925) | Gary Bakko

Road Builders (circa 1925) | Gary Bakko

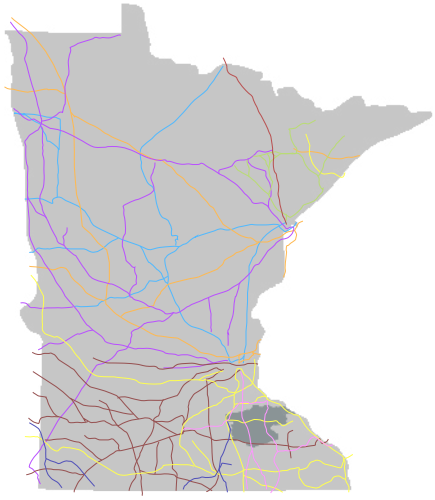
Rail lines are an important part of the region's history, especially considering the industries in Wanamingo and Mantorville. The development of these lines matched that of the small towns: rapid growth in the early part of the 20th century, and a gradual leveling off of expansion soon thereafter. In this way, these towns were very much a product of the railroad industry. The graphic below explores that expansion. (Based on rail maps from Borchert Map Library)



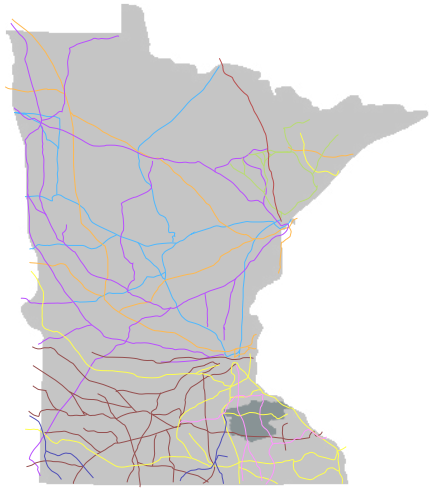
Railroads in 1870



Railroads in 1900



Railroads in 1920



Railroads in 1960

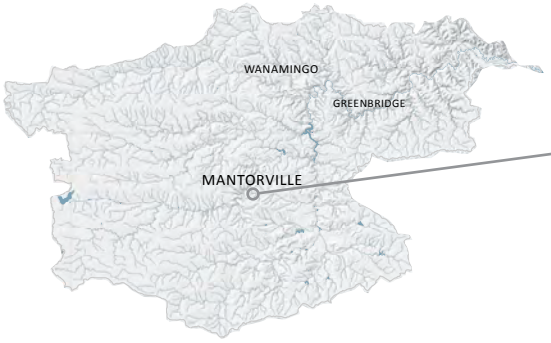
Railroads in 1872 | Borchert Map Library

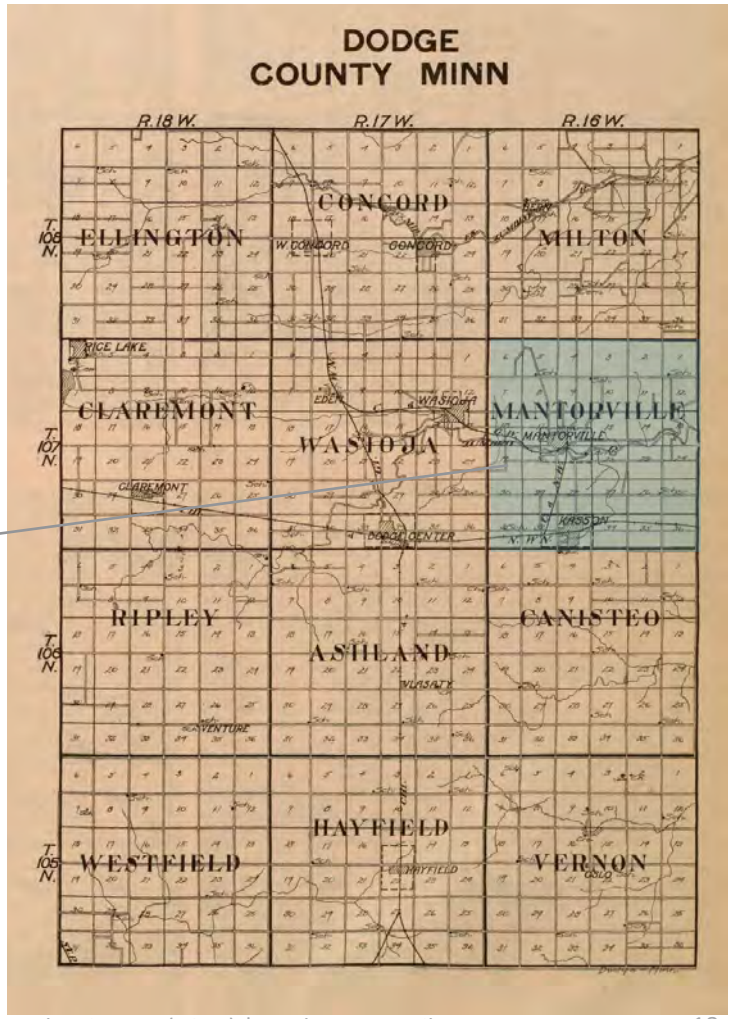
Historic Mantorville

Mantorville is a town with pride in its history. There is a focus on this in present day Mantorville, reflected by the county's active historical society, the town's festivals, and the reverence for historic landmarks.

The history of European settlement of Mantorville begins in the mid 19th century, at a time when expansion westward was becoming common in the United States. Mantor brothers Peter and Riley came from New York and settled the area in 1853. The primary reason for their choice of location was the abundance of materials from which to build. By opening limestone quarries and employing a large workforce, the pair put the town on the map and solidified its place in history.

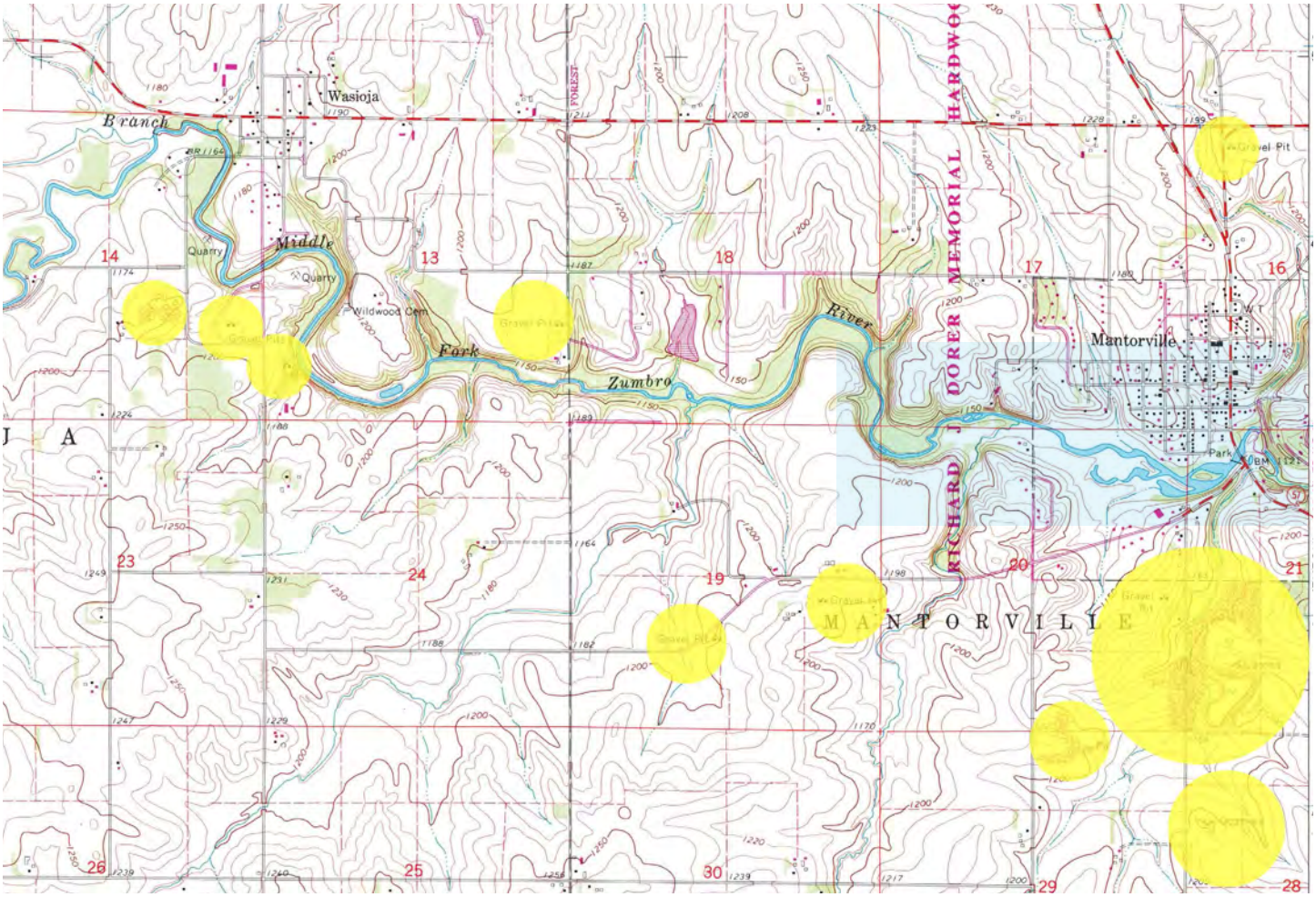
Mantorville limestone is famous throughout the entire region because of its workability and longevity. When first mined, the stone is soft and easy to shape, but after time weathering hardens the stone, rendering it sturdy and long-lasting. There are numerous structures scattered across Minnesota as well as the country that reflect the Mantorville limestone legacy.

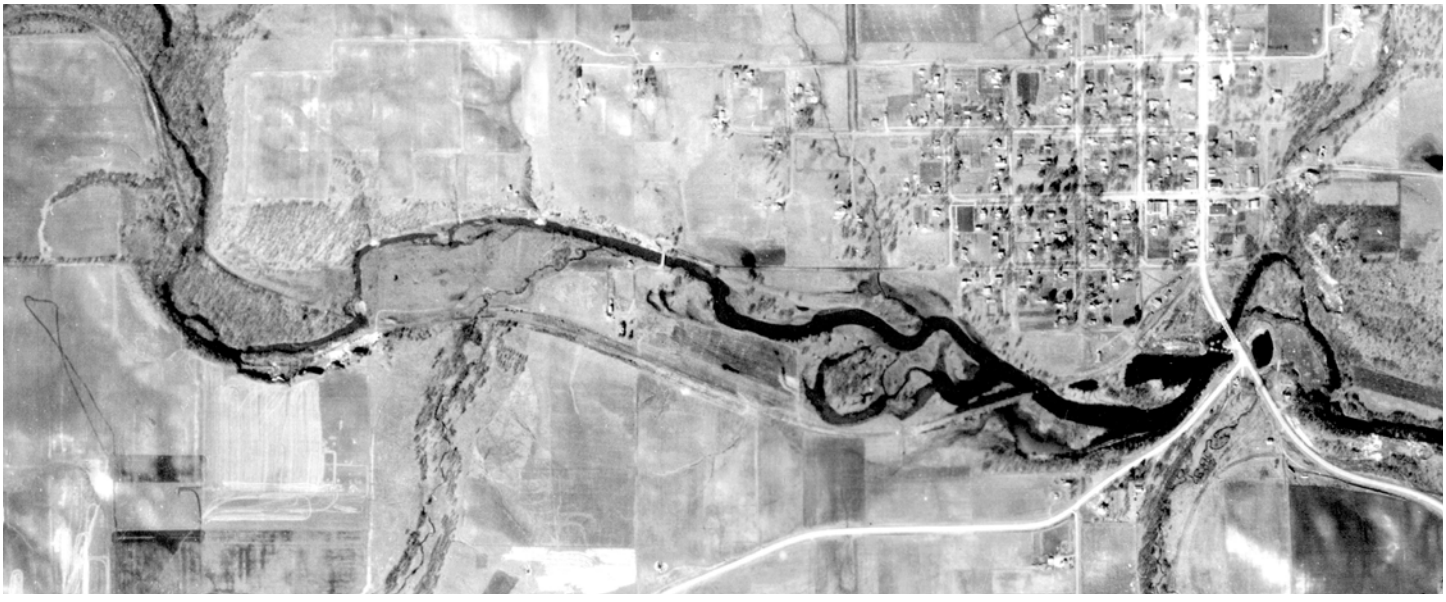




Dodge County (1915) |Borchert Map Library

The image immediately below highlights the rock quarries and gravel pits surrounding the town of Mantorville, reflecting this historic legacy (1965 USGS topo map). The bottom image is a 1938 aerial photograph of Mantorville's downtown area, highlighted in blue on the upper image (Borchert Map Library). The Zumbro River was and continues to be an important part of the economic viability of this area.





Confirming the significance of this town and its legacy, the National Park Service named Mantorville's core downtown area to the National Register of Historic Places in 1975.

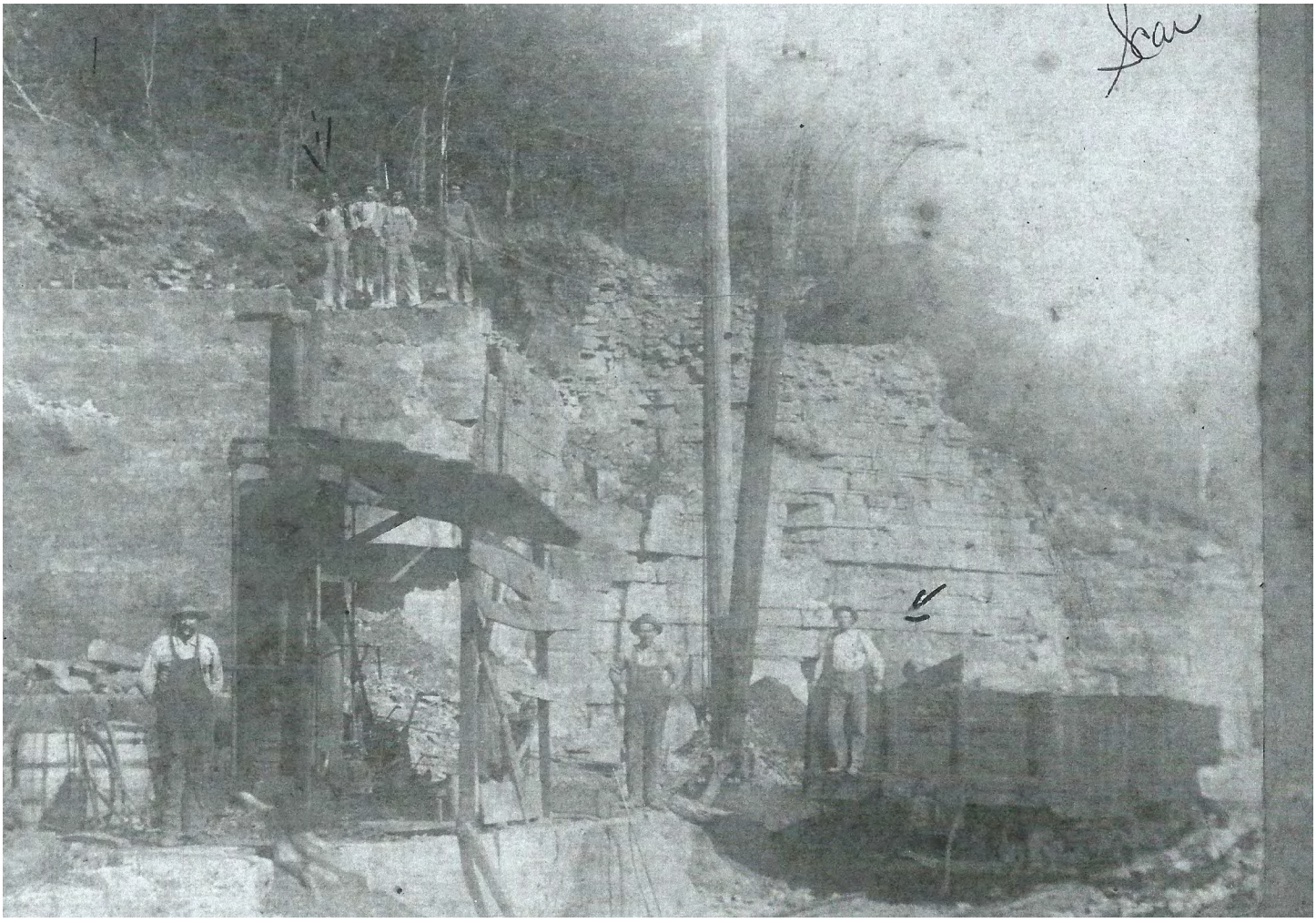
Some of the town's landmarks include the Hubbell House, a very popular bar where travelers would stop and share stories about their journeys and folks they met along the way. The Dodge County Courthouse is another iconic example of the use of native limestone. The limestone in this structure is 40 inches thick, and workers were able to move these slabs to the building site by sliding them over the frozen ground. (Dodge County Historical Society)

Hubbell House | captureminnesota.com


Dodge County Courthouse | MNHS

Mantorville Limestone Quarry (circa 1910) | Minnesota Historical Society (MNHS)

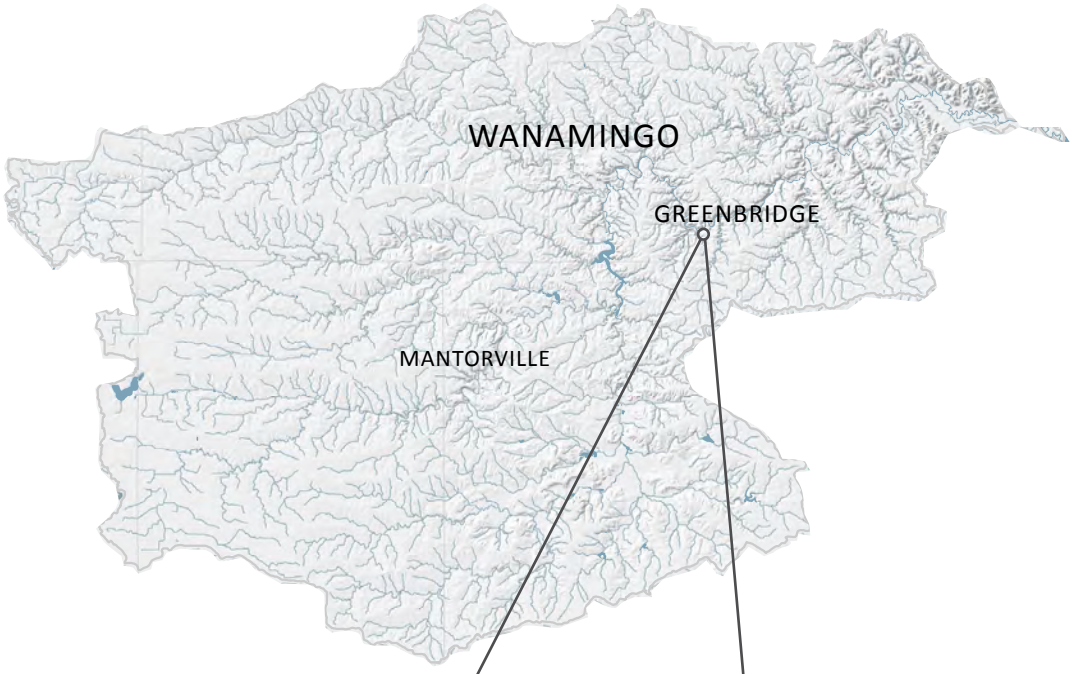
Hubbell House | Dodge County Historical Society



Quarry | Dodge County Historical Society

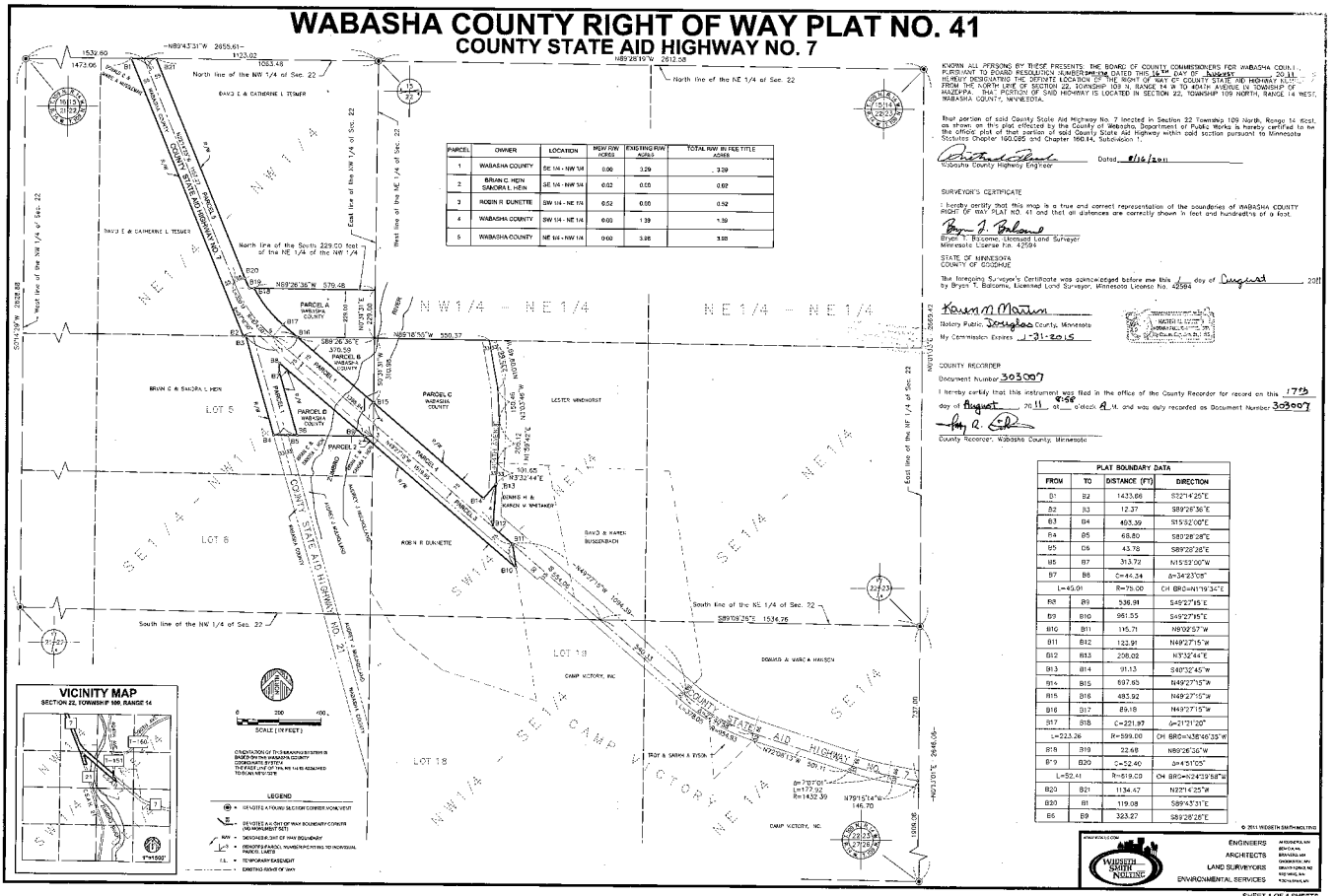
Green Bridge Aquatic Access Area (Greenbridge)

The Greenbridge site lies just north of Lake Zumbro in Wabasha County. The name comes from the original green high truss bridge, #6563 that spanned the Zumbro at the current easement. The steel bridge has since been replaced by a concrete structure, #79550. There is little information on this easement's history, given that it lies outside a specific town. However, because of this reason it has potential for greater ecological value and may be more important to paddlers as an access point.

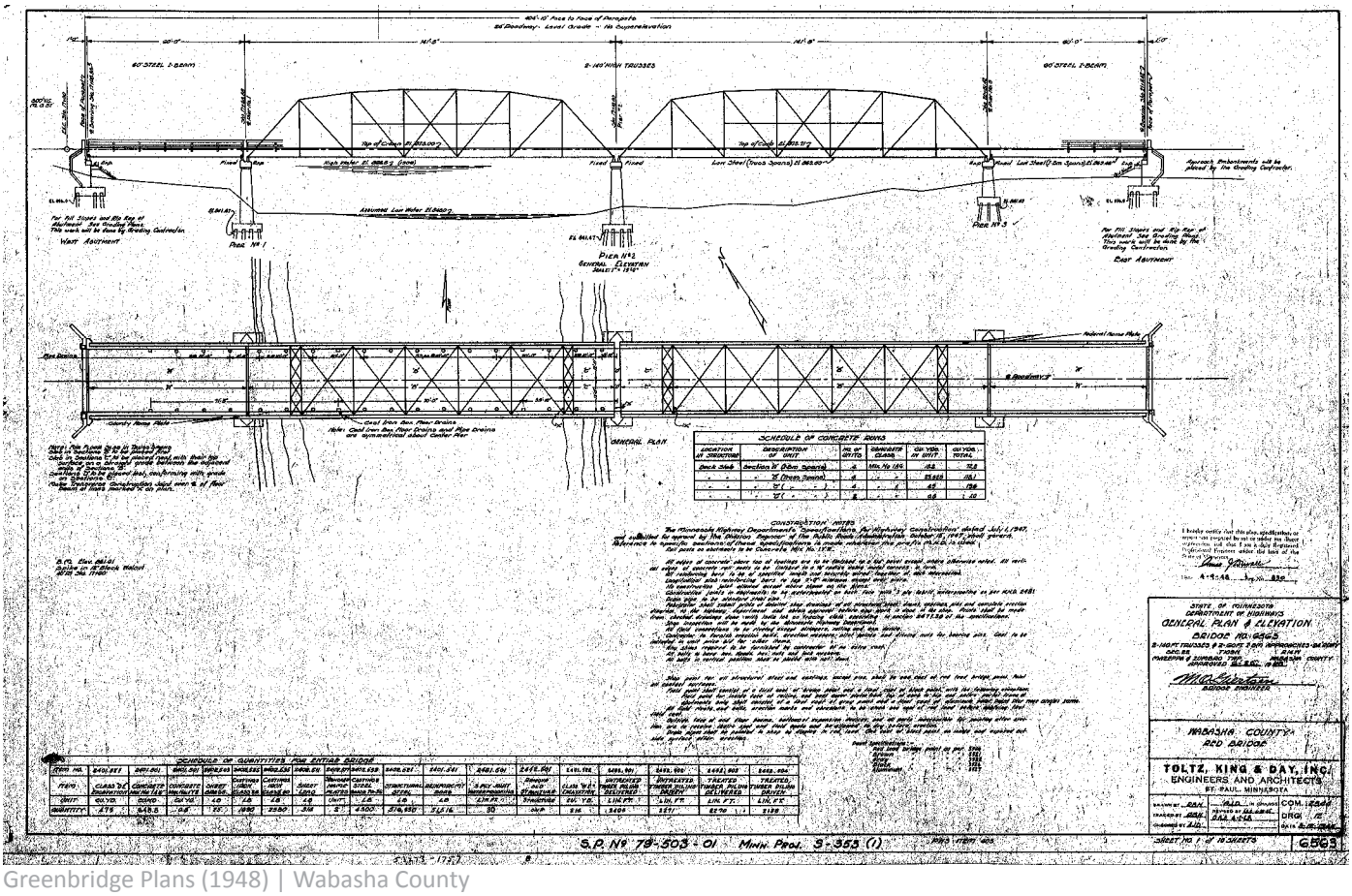


Greenbridge Aerial 1951 | Borchert Map Library

Greenbridge Aerial 1991 | Borchert Map Library



Right of Way Plat (2011) | Wabasha County



Greenbridge Plans (1948) | Wabasha County

ECOLOGICAL HIGHLIGHTS

There are a number of rare and at risk, as well as more common species that inhabit the watershed. The majority of these species depend on the Zumbro River as a key part of their habitat. These are important to identify in order to underline the significance of the area as an ecological corridor. Many people are familiar with the common wildlife inhabiting the watershed, but may be unaware of the breadth of species present.

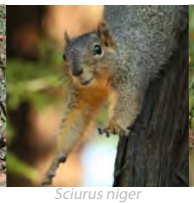
MAMMALS:

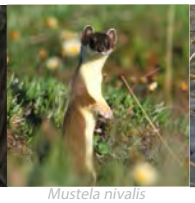

Vulpes vulpes
Red Fox


Odocoileus virginianus
White-tailed Deer


Sylvilagus floridanus
Eastern Cottontail


Spilogale putorius
Eastern Spotted Skunk


Sciurus niger
Fox Squirrel


Mustela nivalis
Least Weasel


Ondatra zibethicus
Muskrat


Perimyotis subflavus
Tri-colored Bat

REPTILES:


Emys blandingii
Blanding's Turtle


Glyptemys insculpta
Wood Turtle


Chelydra serpentina
Snapping Turtle


Chrysemys picta
Painted Turtle


Pantherophis vulpina
Western Fox Snake


Lampropeltis triangulum
Milk Snake


Coluber constrictor
North American Racer


Pituophis catenifer
Gopher Snake

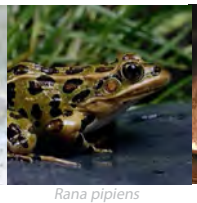
AMPHIBIANS:


Bufo americanus
American Toad


Acris crepitans blanchardi
Blanchard's Cricket Frog

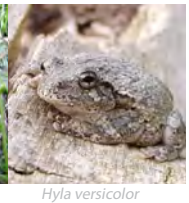

Pseudacris triseriata
Chorus Frog


Rana clamitans
Green Frog


Rana pipiens
Leopard Frog


Pseudacris crucifer
Spring Peeper


Ambystoma tigrinum
Tiger Salamander


Hyla versicolor
Grey Tree Frog

INVERTEBRATES

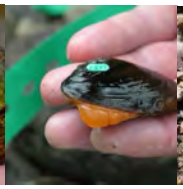

Cicindela lepida
Ghost Tiger Beetle


Speyeria idalia
Regal Fritillary

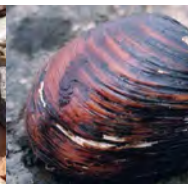

Cicindela macra macra
Sandy Stream Tiger Beetle


Ligumia recta
Black Sandshell


Lasmigona compressa
Creek Heelsplitter

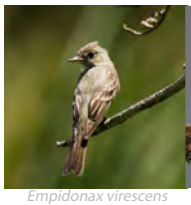

Alasmidonta marginata
Elktoe


Venustaconcha ellipsi-formis
Ellipse


Actinonaias ligamentina
Mucket

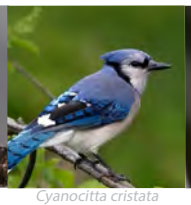
Bird species are important to identify: many raptors and waterfowl are especially indicative of the watershed's health. In addition, birding is a popular way to engage with the wildlife in the area, providing the community with different opportunities to connect with the Zumbro River watershed. Birding is also often associated with using floating watercraft in the river, further enhancing the connection for residents who choose to recreate this way.

SONGBIRDS:

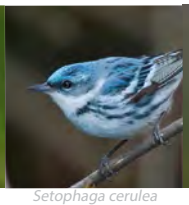


Empidonax virescens
Acadian Flycatcher

Poecile atricapillus
Black-capped Chickadee

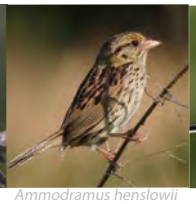


Cyanocitta cristata
Blue Jay



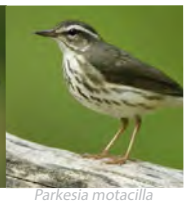
Setophaga cerulea
Cerulean Warbler

Carduelis tristis
Goldfinch



Ammodramus henslowii
Henslow's Sparrow

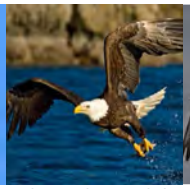
Lanius ludovicianus
Loggerhead Shrike



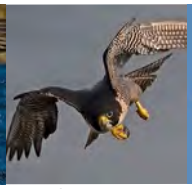
Parkesia motacilla
Louisiana Waterthrush

RAPTORS:

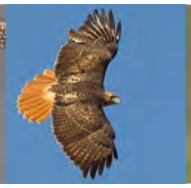
Accipiter cooperii
Cooper's Hawk



Haliaeetus leucocephalus
Bald Eagle

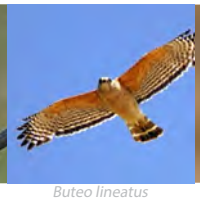


Falco peregrinus
Peregrine Falcon

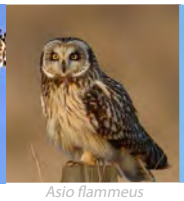


Buteo jamaicensis
Red-tailed Hawk

Accipiter striatus
Sharp-shinned Hawk



Buteo lineatus
Red-shouldered Hawk

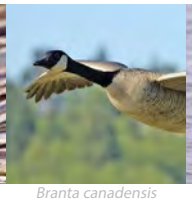


Asio flammeus
Short-eared Owl

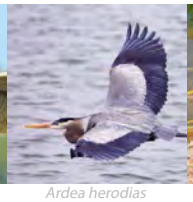
Cathartes aura
Turkey Vulture

WATERFOWL:

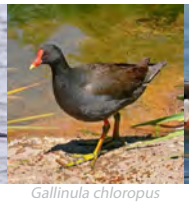
Anas discors
Blue-winged Teal



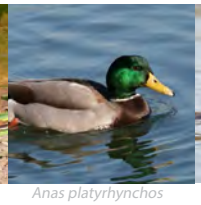
Branta canadensis
Canada Goose



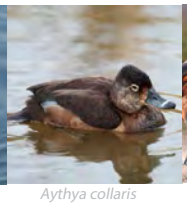
Ardea herodias
Great Blue Heron



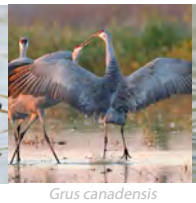
Gallinula chloropus
Common Moorhen



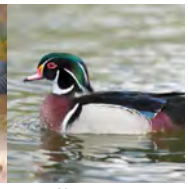
Anas platyrhynchos
Mallard



Aythya collaris
Ring-necked Duck



Grus canadensis
Sandhill Crane

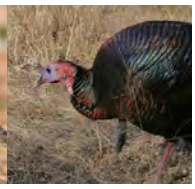


Aix sponsa
Wood Duck

GAME BIRDS:

Phasianus colchicus
Ring-necked Pheasant

Bonasa umbellus
Ruffed Grouse

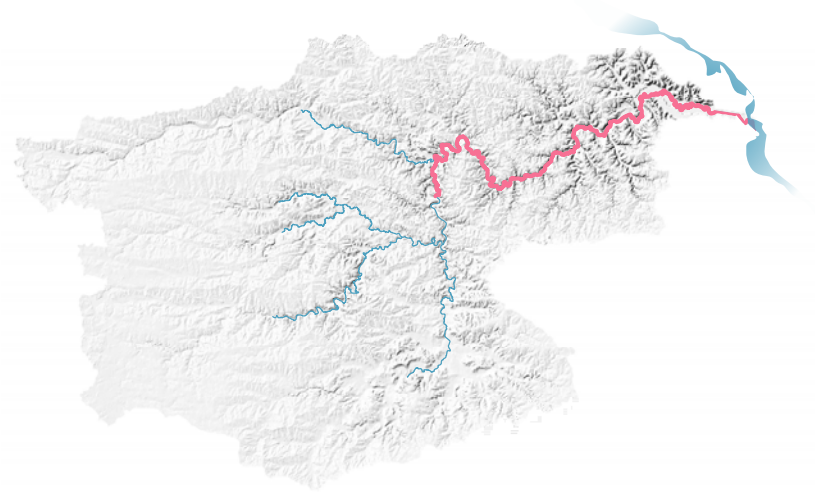


Meleagris gallopavo
Wild Turkey

WATER QUALITY IMPAIRMENTS

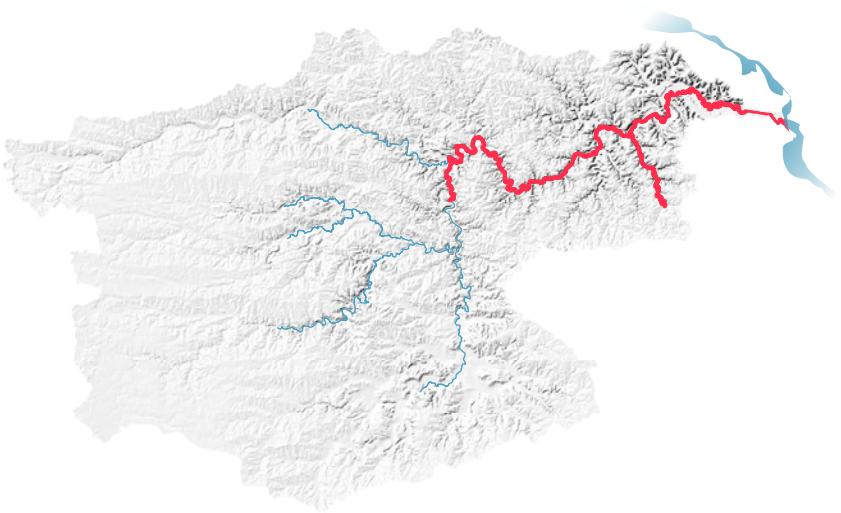
1. PCB Found in Fish Tissue

PCBs, aka Polychlorinated biphenyls, are chemicals sometimes found in the environment. Before being banned in 1976, they were used for stability in electrical equipment because of their ability to resist flame. There are a number of ways these can be removed from fish before eating, but they are still quite harmful in the environment.



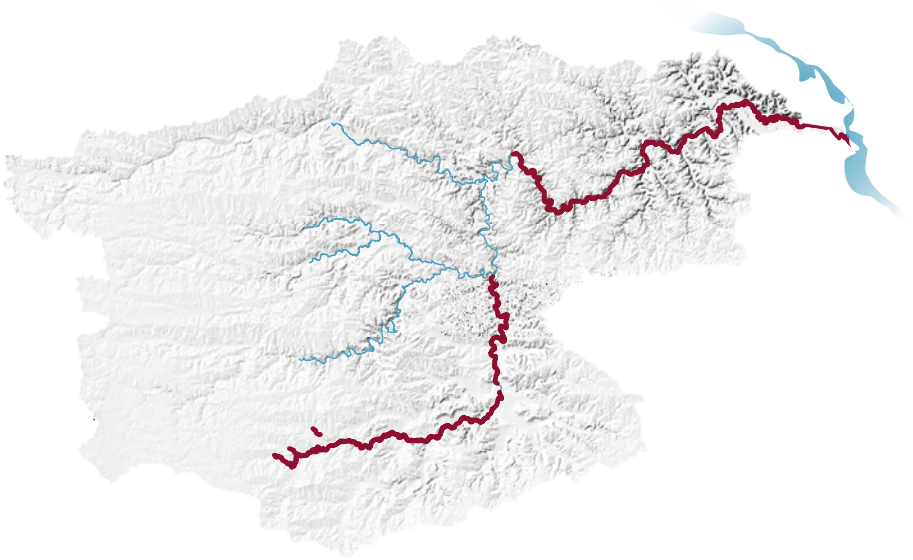
2. Mercury (HGF) Found in Fish Tissue

Fish are efficient absorbers of mercury, though they release it quite slowly. Much of the mercury found in fish tissue can be traced to coal-fueled operations. As such, much more mercury is found in urban environments. Human consumption of fish with these concentrations can be dangerous, and should be avoided when possible.



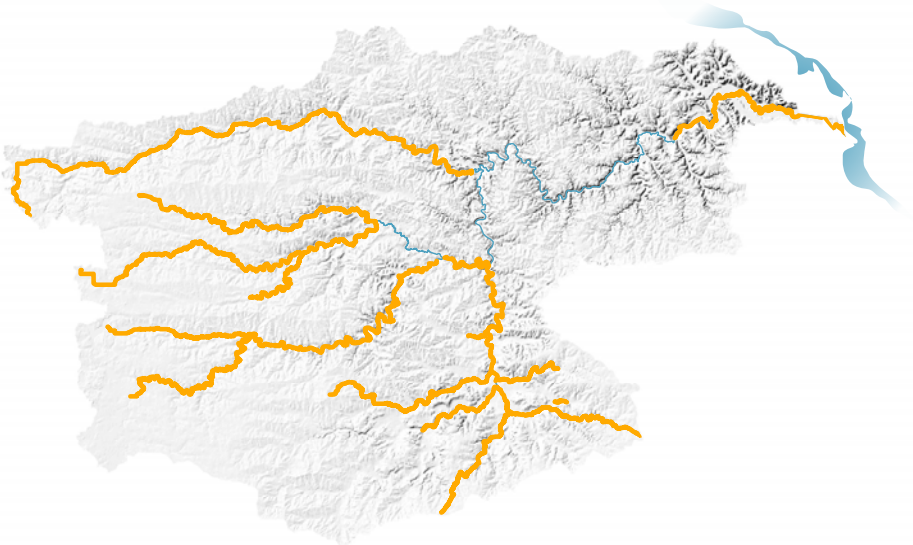
3. Fecal Coliform

This bacteria finds its origins in animal and human intestines. However, feces are not always implied when fecal coliform is found in a stream. It could enter the river through stormwater and agricultural runoff, as well as through discharge from nearby septic systems. It is possible that fecal coliform is not directly harmful when exposed to humans.



4. Turbidity

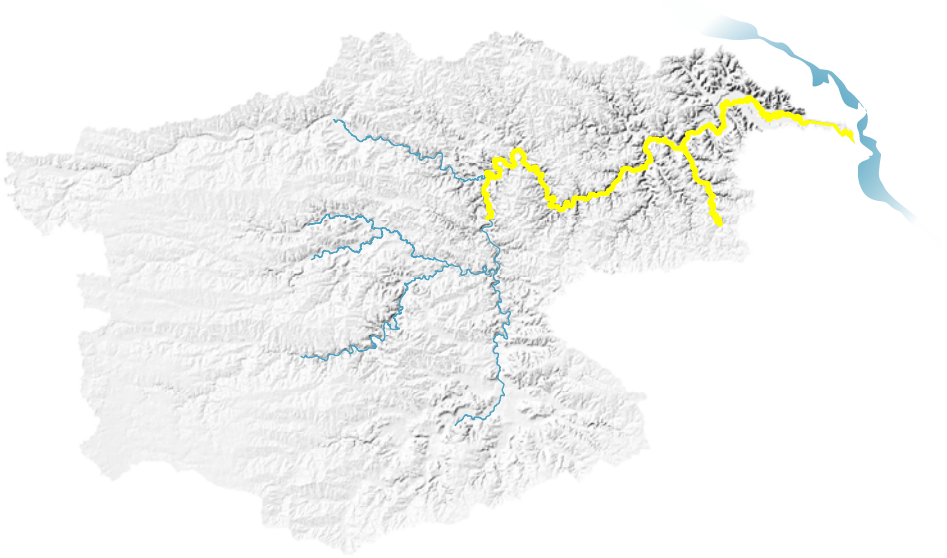
Turbidity measures the amount of light that passes through a given sample of water, which is dependent on the amount of suspended material in that water. These materials are often, but not always, soil particles and algae. Turbidity is related to many factors in water, including the lowered levels of dissolved oxygen, lower amounts of photosynthesis occurring, and higher overall water temperatures. Turbidity generally increases after large rainfall events and within urban areas.



4. Impaired for Aquatic Consumption

As defined by the Minnesota Pollution Control Agency,

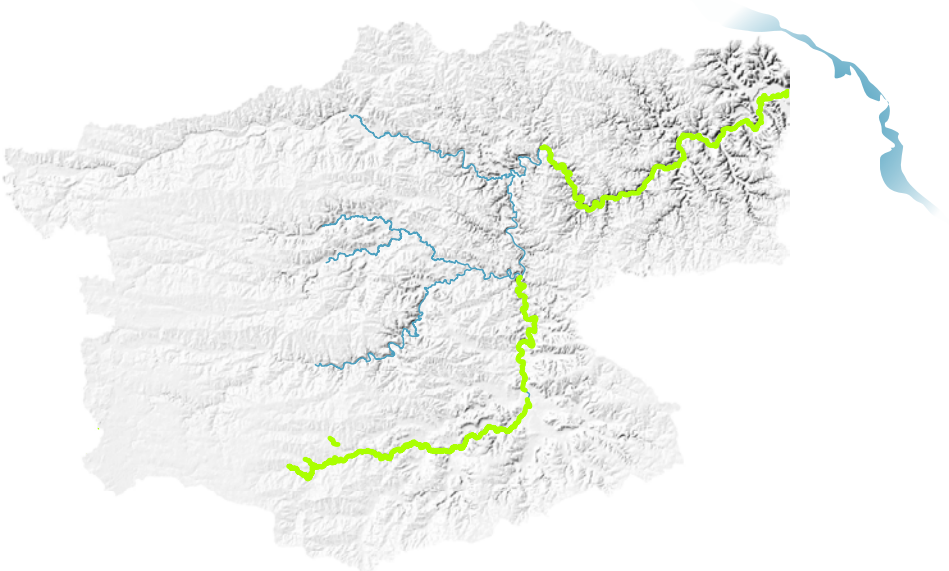
"Fish are sampled in both lakes and streams to determine if they are fit for human consumption. In general, if polychlorinated biphenyls, perfluorooctane sulfonate, or mercury exceed safe levels in the fish tissue, restrictive consumption guidelines are developed for fish from that resource and the lake or stream reach is considered impaired for aquatic consumption. The Minnesota Department of Health is responsible for determining fish consumption guidelines."



5. Impaired for Aquatic Recreation

As defined by the Minnesota Pollution Control Agency,

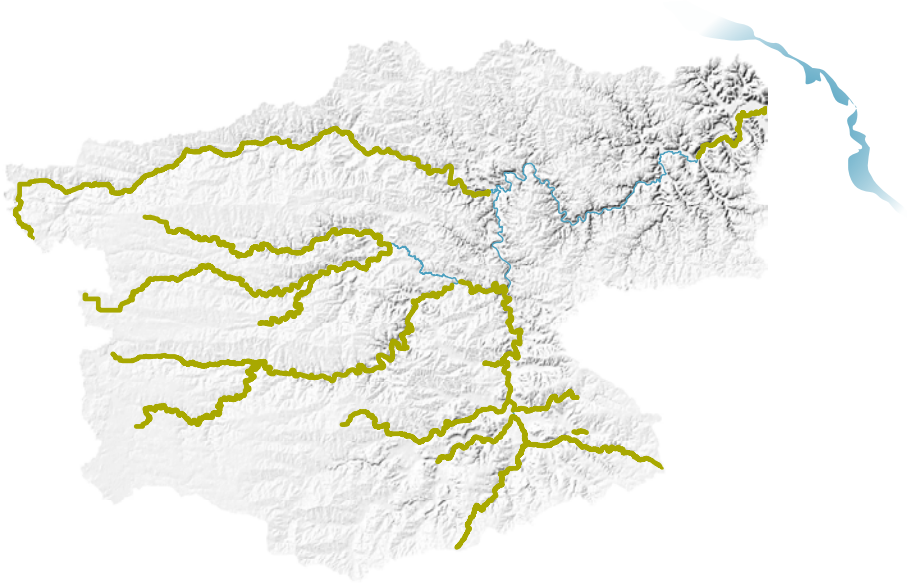
"Streams are assessed to determine if water quality meets thresholds set for protecting aquatic recreation uses, such as swimming and wading. E. coli levels are currently used to determine aquatic recreation use support in streams. In general, if bacteria levels exceed thresholds, the possibility of illness from water contact increases."



6. Impaired for Aquatic Life

As defined by the Minnesota Pollution Control Agency,

"Streams are assessed to determine if water quality meets thresholds set for protecting aquatic life uses, such as supporting a healthy fish and aquatic insect community. A variety of parameters affect aquatic life: dissolved oxygen, suspended sediment, toxics (e.g. chloride, ammonia), and pesticides. Biological communities (fish and aquatic insect) are sampled and, with water chemistry data above, are used to determine if aquatic life is being supported. "



7. Soil Erodibility

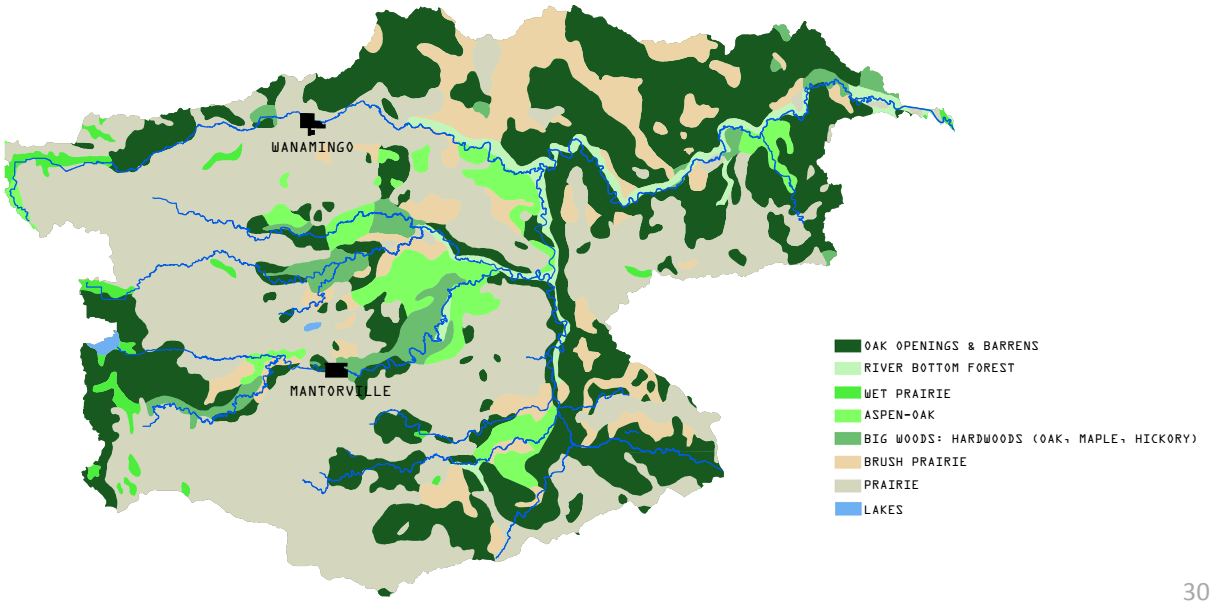
Sediment is a natural water quality concern, the effects of which are heightened by many current land use practices. Though some types of soils are naturally more susceptible to erosion than others, this too can be affected by land use practices.

8. High Quality Trout Streams

The streams indicated below are those with conditions healthy and cool enough to support trout habitat.

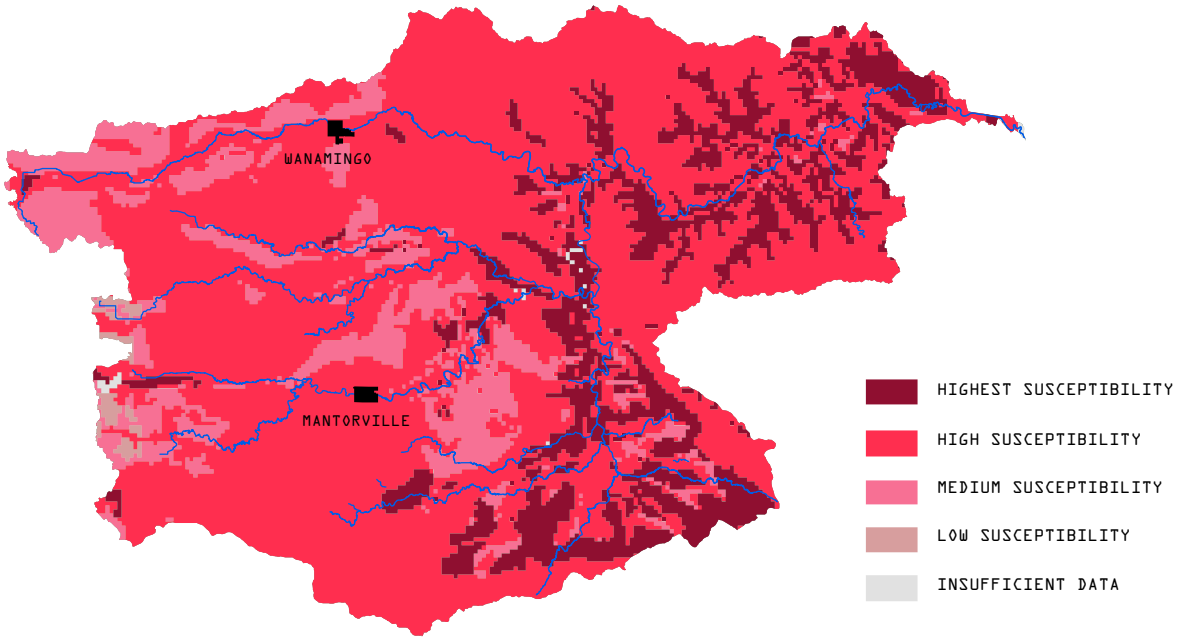
9. Presettlement Vegetation

Identifying plant communities that existed in the area before modern day development can help to get a sense of the watershed's former characteristics and state of health.



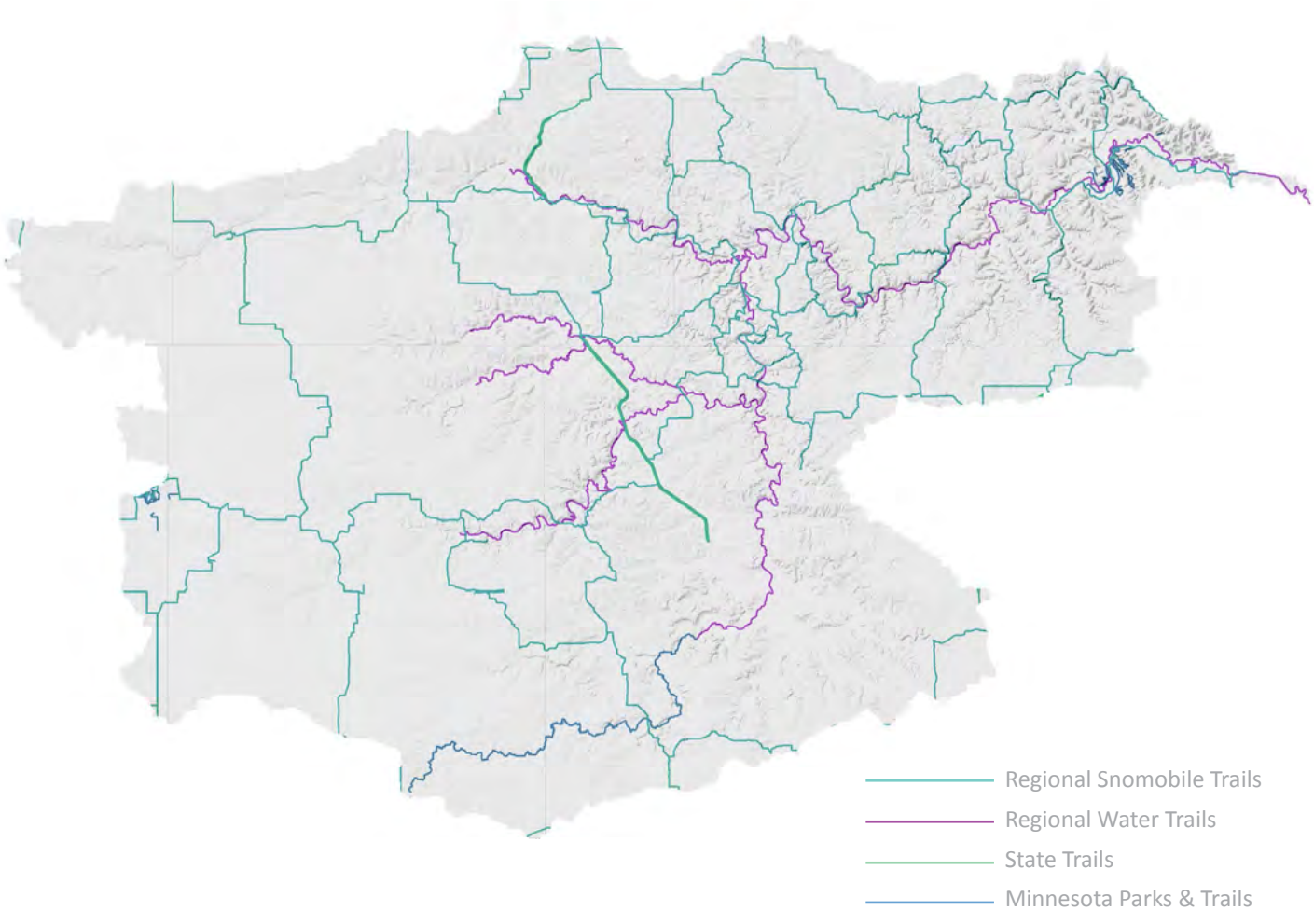
10. Groundwater Susceptibility to Contamination

"In 1989, the Minnesota Pollution Control Agency published a statewide evaluation of ground water contamination susceptibility. The assessment used four parameters (aquifer materials, recharge potential, soil materials, and vadose zone materials) to delineate areas of relative susceptibility to ground water contamination." (Minnesota DNR)



CONCLUSION

The ultimate goal of this research is to contribute to a larger objective, “creating public outreach information to support a culture of water quality stewardship in the Zumbro Watershed”. By gathering the types of information shown in this publication, the outreach efforts made by the Zumbro Watershed Partnership will be more holistic and far-reaching. Eventually, a larger, more diverse population could more readily engage in recreational opportunities (as outlined in the map below) because of the connection they feel with their local environment. By identifying with the watershed’s historic, ecological, and personal significance people will begin to value this resource and create a culture of water quality stewardship.



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